VERSION 8

MASTERFILE

BUSINESS/DOMESTIC FILING SYSTEM

FOR 48K ZX SPECTRUM

CS

ZX FAIR - ALEX PALACE.   3/12/83

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OVERVIEW

MASTERFILE is a filing and retrieval system for use with the 48K ZX Spectrum. It is almost entirely machine-coded for compactness and speed, and offers about 32K of data per file. Files can be saved and loaded independently from the program, and stored either on cassette or Microdrive cartridge. Because MASTERFILE display formats are user-defined, the range of applications is enormous, both for domestic use and for business. Address lists, library catalogues, personnel files, stock inventories, school exam results, family trees - all these are easily handled by MASTERFILE.

Some of the main features of the program are...

- Menu-driven
- Dynamic variable-length file
- User-defined data names and report formats
- Sequence by any data type
- File search by any number of criteria
- Display 1-22 records per screen
- Print to the ZX Printer
- Total/average
- Update, Copy, Erase any record
- Save/Load files, save program
- Optional User Basic Interface
- Microdrive compatible
- Very fast in operation

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GLOSSARY OF TERMS

ADD   Insert a new Record onto the end of the File.

ARGUMENT   In search mode, something with which records are to be compared.

AUTO-PROMPT where new data items are solicited automatically.

BACK OUT   Change one's mind

COMMAND MODE where cursor is flashing K and awaits line number or Basic keyword.

DATA NAME Legend associated with a data reference.

DATA REFERENCE   Letter A-Z by which data items are identified.

DISPLAY MODE where selected records are viewed in a Report.

EDIT MODE where Report formats are created/altered.

EMPTY FILE one devoid of records, data names, report formats.

FILE   Collection of Records, and associated Data Names and Report Formats.

GENERAL   Overall attributes of a Report.

INVERT   Flip select status of all records.

ITEM   Data, 1-128 characters in length.

LITERAL TEXT Static text, e.g. a heading, in a report.

MAIN MENU The menu offered when the program is loaded.

MENU   List of key options.

MF   Abbreviation for MASTERFILE.

MM   or mm: abbreviation for Main Menu.

NULL TEXT legend shown in a report in the absence of an item.

PAD   Fill out data with spaces in a report.

PROMPT   Instruction to the user, or small menu.

PURGE   Erase all selected records.

RECORD   Collection of up to 26 items, each with a different Data Reference.

REPORT   Display of selected Records.

REPORT ELEMENT A part of a report, e.g. heading, box, data spec.

REPORT REFERENCE Character 0-9,A-Z identifying a Report.

RESET   Clear select status of all records.

SEARCH MODE where records are selected or otherwise by comparing with an Argument.

SELECTED Eligible for display in a report.

SEQUENCE where records are listed in ascending order by one item.

UPDATE MODE where a record can be altered.

USER BASIC Basic which you can supply for special processing.

FILE STRUCTURE

A file is an organised collection of data which is stored on cassette or cartridge, and which can be loaded into RAM for enquiry or update purposes. It could be simple like a telephone list, or complex like a personnel data file. But in every case, a file is made up of records, each of which is usually related to a particular identifying item, e.g. a person, a recipe, a part number. Each MF record is in turn made up of up to 26 different items of data, e.g. name, address, telephone number, stock level. Data items are all treated by MF as being of variable length, up to 128 characters long. There is no rigid record structure, and items can be stored in any order within a record; for this reason, items are tagged with a data reference letter. A record cannot have more than one of any data reference; this is an important limitation to bear in mind when designing the structure of your file. All data is stored in character format.

One of the many advantages of a computer file over a card index system is that you can sort it into any order. MF does not actually sort your file, but instead lets you view it in any sequence you choose. And you can have different logical views of the same data, in different sequences, a feature normally seen only in large computer systems. Further, you can be selective about which items are required in a report, and you choose the display style. You will compose a report format for each view of the file which you need. Once the formats are built, they are saved automatically as part of the file.

While items are referred to using a single letter, you can associate a word or phrase with each reference letter, which MF then displays whenever you use data references. (Especially in Auto-prompt, q.v.). We call these data names, and these names are also stored automatically as part of your file.

MENUS, PROMPTS, MODES

MF menus are yellow and respond to upper-case or lower-case keys impartially. When MF is loaded, it presents the Main Menu (mm). The mm screen also displays the File Name (up to 10 characters) and the MF version number. When a valid menu key is used, MF either takes the indicated action, or immediately offers another menu or prompt. A prompt is a one-line instruction or menu in the lower part of the screen, and takes priority over any other menu. All the yellow menus and prompts respond to just a single key. But where MF requires a textual response, the flashing L cursor appears and you terminate your response with the ENTER key.

MF nearly always offers a menu or prompt, but there is one exception: when in Display mode the menu would obliterate your display, so it is not usually shown. But you can overlay your display with the menu, by using the Q key - and use Q again to remove the menu.

MF operates in a variety of Modes, usually shown by a blue heading. (But not display mode - we leave lines 0-21 to you. Display mode always shows "Report n" in red on line 22.). The important modes are described in the Glossary, and some modes - Search, Display, MM - are accessible by several menu routes.

It would be a little dangerous to allow a single-key response to erase data, so MF always asks confirmation via the Y key. Likewise, User Basic is potentially drastic, and again requires Y to confirm. If you see "Y to confirm" you can back out with any key except Y.

BASIC COMMAND MODE

With a few exceptions, MF runs under machine code control and the BREAK key is ineffective. But if you need to adapt the Basic (e.g. for Microdrive) or if you need to put in your own User Basic, then you must get into Command Mode. This can be done only when MF offers a flashing L cursor, e.g. press L at mm. If you then respond with CAPS SHIFT held down and 6 , you get "H STOP in INPUT etc" and now you are in Command Mode and can list and alter the Basic.

To resume MF processing, give the command "GO TO 1", which takes you to the main menu again. GO TO 1 should also be used to recover any accidental drop into Command Mode. Do not CLEAR or RUN, since these will cause MF to fail.

GETTING STARTED

Your MF cassette contains two identical recordings - either consecutive, or one each side. Each recording is in two parts...

    (a) Program: MF
    (b) Bytes: MF mcode

Part (a) is in Basic, and includes the example file. Before loading MF Basic, remember this first vital step...

    CLEAR ~~57343~~ *57036*

Now you can load the program, using...

    LOAD ""   or   LOAD "MF"

Once loaded it automatically loads part (b), which is about 8K of machine coded MF logic. Just leave the cassette playing until mm appears.

The reason for the CLEAR 57343 is to reserve the top 8K of RAM for the MF machine code. We cannot put the CLEAR into the MF Basic, because that would erase MF key variables, including F$ which contains the file. MF will not work if any other interface software has to use RAM above ~~57343.~~ *57036*

MAIN MENU OPTIONS

The main menu represents the top logical level of processing and offers functions which affect the file as a whole. Some functions are described more fully elsewhere.

A   Add a new record onto the end of the file. A one-byte record is inserted, and you can see the "Recs=" and "Sel=" counts increment. MF is then in ADD RECORD mode, q.v.

C   Lists all report references, together with top-most heading of each report. You can switch to Display mode by pressing the report reference of your choice, or you can use ENTER to return to mm.

D   Switch to Display mode to view Selected records. The report format used will be either the first one created, or the last one used. If there are no report formats yet, Edit mode is entered. Several other menus offer a D option. See DISPLAY MODE.

E   Switch to Edit mode to review or update report formats. See EDIT MODE.

L   Load a file which has been saved via mm V F etc. See LOAD AND SAVE.

N   Review or update data names. See DATA NAMES.

S   Switch to Search mode to identify records according to the values of data they contain. See SEARCH MODE.

I   Invert the Select status of every record. Selected records will become unselected, and vice versa.

R   Reset the Select status of all records to unselected, which will show "Sel=00000". To select ALL records, just use R then I.

P   Purge - i.e. erase - all selected records. As with all erasures, confirm with the Y key.

T   Compute total and average of numeric data across all selected records. T is also available from Display mode. See TOTAL/AVERAGE.

V   Save program and file, or file only. See LOAD AND SAVE

U   Process all selected records via User Basic. See USER BASIC.

EMPTY FILE

You should keep a version of MF which has an empty file, and use it whenever you need to start a new file application. To create your empty file, you must clear the example file, as follows...

(a) Erase all records: mm R I P Y

(b) Erase all report formats: mm E. Then R 1 X Y which erases report format 1. Then R 2 X Y to erase report 2, and so on for 3,4. Then M back to mm.

(c) Erase all data names: mm N, then E Y, E Y, etc until no more data names are displayed. Then M back to mm.
Now save the program, via mm V F EMPTY etc. This also provides you with an additional back-up of the program. You may also wish to save the empty file by itself, via mm V F EMPTY etc. Note that an empty file still contains essential system information within F$.

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DATA NAMES

It is advisable - although not essential - to give each of your data references a name. Data names can be up to 128 characters in length, and are stored as part of the file. They are essential if you wish to use auto-prompt when adding new records. Use mm N to review or alter your data names. You will see the same menu as appears in Add a Record, but options F and D do not function. Use A to add a new data name, N to browse through the names, R to replace a name, E to erase a name. Use M or D to return to mm. The order in which you add data names determines the order in which data is auto-prompted.

EDIT MODE

Entered via mm E, Edit mode is concerned with the creation and modification of report formats. Up to 36 report formats may be defined, giving that many logical views of your selected records. Some effort is required to edit a report format, but this is typically a once-only task.

The menu reached via mm E invites you to create a new format (A) or review/alter an existing format (R). You can also return to mm (M).

After A or R, give the report reference, 0-Z, as prompted. The report reference "Ref n" is then shown in red at top right while in Edit mode.

When a report format is first created, it is given the following "General" characteristics...

    a) Background paper colour of 7 (white)
    b) Screen border colour of 7
    c) Sequence - none, unsorted
    d) Interval of one record every 2 lines

You can change these at any time just by using menu option R whilst "General" is displayed. You are then prompted for a) to d). Reply to a) and b) with key 0-7. Reply to c) with the data reference of the data by which the report is to be sequenced, or else ENTER if no sequence is required. Reply to d) with 1-22, being the interval down the screen at which records are displayed.

To show just one record per screen, use an interval of 22. To list one record every line, use an interval of 1.

You must add some Report Elements: these describe headings, lines, boxes, and data to appear in the report. There is no limit to the number of elements. You can even display the same data more than once. Use Edit menu option A to add a new element, whereupon another menu asks what kind of element is being added. All elements except data elements are static, and will always appear whether any records are selected or not. They are...

    L Literal - e.g. title, column heading, currency symbol.
    B Box - a rectangle drawn to pixel resolution.
    H Horizontal line.
    V Vertical line.

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For a Literal, press L and supply the data as prompted...
Line number, column, Paper, Bright or not, Inverse or not, Flash or not, and the
literal text. If text overflows column 31 in the report, it will resume next line,
column 0. Ink colour is not prompted - MF always uses contrast.

For a Box, press B and supply as prompted the co-ordinates of the top-left corner,
depth in pixels less 1, width in pixels less 1.

For a line, press H or V and supply as prompted the leftmost or topmost pixel, and the
length in pixels less 1.

So much for the static elements - now we consider the data elements. Data elements
specify which items of a record are to be displayed, where, and with what attributes.
Having pressed A to add an element, press D and reply to a quite long list of
prompts...

a) Data reference of the target item.
b) Line - the line at which the first selected record is to display the item.
c) Column
d) MF lets you display data in any character rectangle, and so you are prompted for...
Width - number of columns wide, and...
e) Depth - number of lines deep.
f) Spectrum attributes Paper, Bright or not, Inverse or not, Flash or not.
g) Pad or not: Pad will fill the rectangle with the chosen paper colour.
h) Null text; if data is absent in a record, then you can supply text to appear in its
place. e.g. "not known", or "-". The default null text is a single space.

Numeric data will be shown right-justified, provided that the field depth is 1, and
Pad=N.

The above fully describes how an item of the first selected record appears in your
report. Items from further records will be displayed lower down the screen, at
intervals of whatever interval you have in "General".

You can browse through your report elements by using N ("Next element"), and any
element can be replaced by using R and then following the promts. There is also an
element erase option, E. You can go straight to Display mode via D, to see the result
of your changes.

The report format as a whole can be erased using X, or copied using C. Copy is very
useful when you want to build a report similar to one already built; perhaps you just
want the same layout but different sequence. After C or X you see the inital Edit menu.

An interesting use of Null Text is to use an un-used data reference in a data element.
This is how we get the dashes lines between records in our example file. The null text
is a line of dashes, and always appears because the target data reference is never
present in the records.

Plan your report formats on paper before coding them. Aim for an exact number of
records per screen, by choosing suitable line numbers and interval. Beware overlapping
elements, or overlapping records - MF does not check for these.

ADD A RECORD

The usual way to add a new record is via mm A, which builds an empty record onto the end of the file. The menu then invites you to add (insert) an item (A), Auto-prompt items (P), or exit to Display mode (D) or to mm (M). Other menu options are shown, but are not immediately applicable.

To put data into a new record, you can use A and supply the data reference and the text. The text is a maximum of 128 characters, and trailing spaces are dropped. No tokens, graphics, colour controls, are allowed - they get altered to ^ if entered. CAPS SHIFT/LOCK may be used. The item is displayed in bright white under its red data ref/name.

An alternative method of data entry is via (P), which is Auto-Prompt. This causes MF to solicit each item by scanning your data names. Auto-prompt obviates the need to remember all your data references, and also makes it unlikely to omit an item. You just enter text, ENTER, for each prompted item. MF briefly displays it before prompting the next item. If you have no data for an item, just use ENTER. ENTER quickly followed by SPACE will end the prompts.

Having added one or more items, you can browse through them for checking, using Next Item (N). And you can replace using R, or erase using E. Instead of holding the N key down to reach an item, you can summon it directly using the G key followed by the target data ref. But if you attempt to G an item which is not present, MF waits for you to give a different ref, or back out via ENTER.

If you start a replace (R) by mistake, and wish to back out, just delete or blank your reply and press ENTER. MF will leave the original item intact.

Befor you can add another record, you must first go back to mm (M).

There is a way to insert a record at a particular place in the file - using Display mode COPY. See DISPLAY MODE.

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DISPLAY MODE

Display mode is where you view your selected records in a way dictated by one of your report formats. You can display via mm D, but there are many other menus which offer the same D option. The report format used is that which was last used, or else the first format. Another way to Display mode is via mm C where you choose a report ref.

The contents of lines 0-21 are dependent upon your report format - you have a free hand here. Line 22 shows the following...

   Report n   Q-menu   No more
   (red)   (yellow)   (blue)

where "n" is the report reference, and the blue legend can be ".. more" when there are more records to be displayed than there is room for on the current screen.

Once line 22 is displayed - some sequenced reports can take a few moments to fill the page - a list of menu functions is available. The menu is not shown as a rule, but you can summon it with Q - and banish it again with Q. The functions are as follows...

N   If ".. more" is shown in line 22, use N to see the next page of the report.

1-9 Advance the report by 1-9 records. Sorry, we do not have a "back 1" function, so be careful not to overshoot. Use 1-9 to position a record at top-of-screen ready for options U/E/O/C below.

B   Resume the report from the first record.

P   Copy lines 0-21 to the ZX Printer, or equivalent. Use the S (Single) to print just the current page. Or, use A (All) to print the current page and all further pages. To abort a print, use BREAK and GO TO 1.

U   Enter UPDATE mode with the top-most displayed record. If Display mode is resumed from Update mode, the same target record is shown.

E   Erase top-most record. (Y to confirm)

O   (Letter "Oh") un-selects the top-most record. The record is not erased.

C   Copy the top-most record. A new record identical to the top-most record is inserted next to it. The copy record can now be altered via U etc, and so here we have a means of inserting a record at a particular place in the file.

S   Enter Search Mode.

T   Compute and display total/average.

R   Switch to a different report format, resuming at the same top record as currently displayed. You are prompted for the new report ref, and so it just needs two keys to switch from one report to another. The reports need not be in the same sequence. This facility is particularly useful to switch from a summary report (say 20 records per page) to a full expansion (1 record per page) of the top record.

M   Return to mm.

Q   Display the menu just described - press Q again before doing anything else.

WORD PROCESSING

When data is displayed via Display mode, MF performs rudimentary word-processing such that leading blanks are ignored, a clean left margin is maintained, and word-breaks are minimised. This means that text can be entered without having to worry about spacing. MF will start a new line rather than split a word, unless the last line is already reached.

The vertical line character (VLC) has a special use in MF. A VLC is found via Extended mode symbol-shift S, i.e. the little red mark under the S key of the Spectrum keyboard. The VLC is a force-line-break signal, so you use it in an address for example. You key the text as a single data item but with VLCs as line separators. Now when the data is displayed in a 4-line block, for example, each VLC forces a change of line. This is ideal for address labels.

Notice that when in Update mode, item data is shown without word-processing, and VLCs are visible. But in Display mode the VLCs do not appear.

If there is insufficient room to display an item, truncation occurs on the screen, although the full data is kept in the file.

UPDATE MODE

This mode is where a record can be updated, i.e. its component items can be reviewed, replaced, or erased, and new items can be added. The target record for update is always the top one displayed in Display mode. Indeed, update mode can normally only be reached from Display mode, with at least one record displayed. Use N and 1-9 keys to position the target record at the top of the screen, then press U. Now your options are almost identical to those described in ADD A RECORD, and indeed the same menus and prompts are offered. The difference is that you can use D to resume Display at the same target record on completion of the update.

EXERCISE

Here is a short exercise showing how to set up a simple file of names and telephone numbers, starting from an empty file. Follow the steps described in EMPTY FILE before starting this. We shall use the following notation...
     ⚡ = ENTER key is pressed
     .Comments - do not key the brackets or their contents)
Follow this exercise exactly, and slowly - taking note of every menu and prompt. Start at mm of the empty file. We show the menu responses in CAPS but you can use unshifted keys. Here we go...

NANname⚡ATtel number⚡M (This defines two data names: "name" for data ref N, and "tel number" for data ref T. Now we will add some records...)
AANJones P⚡AT01-234 5678⚡M   (We have stored one record, with the telephone number of P.Jones. Now for another record...)
AFAtkins R⚡0232-66554⚡M (This time we used auto-prompt to enter the data for R.Atkins. Do a few more this way...)
APSmith John⚡2332-45664⚡M
APAirport⚡01-887 23459⚡M
APHairdresser⚡876-5432⚡M
 We now have 5 records, and now we must use Edit mode to compose a report format so we can view our file...
EA1 (start of report ref 1)
4L0⚡8⚡1YNNTelephone-List⚡ (Puts a heading "telephone-List" in blue at line 9 column 8.)
ADN3⚡1⚡16⚡1⚡7YNNN⚡ (To show names starting at line 3, col 1, 16 characters max, 1 line deep, paper white, bright, inverse no, flash no, pad no, no null text.)
ADTJ⚡18⚡14⚡1⚡2YNNN---⚡   (To show tel numbers starting at line 3, col 18, 14 characters max, 1 line deep, paper red, bright, inverse no, flash no, pad no, null text of "---".)
 We can now test the report by going to Display mode...)
C (Looks Ok, but how about sorting it by name ? and a few other changes. Go back to Edit mode...)
MER1 (Review report ref 1...
P⚡ENT⚡   'Background paper stays white, border set to yellow, sequence by N, interval to 2 lines.)
ABO⚡155⚡16J⚡255⚡ (Now we have described a box. See the effects of these changes now...)
D (Hey presto, the display is sorted by name - see why it is best to place initials after surnames " - and note the border and interval changes. Now reset interval to 2 and finish off with some fancy stuff...)
MER1 (Review report ref 1...)
R76N2⚡ (resets interval to 2)
ADJ4⚡0⚡32⚡1⚡7NNNN------------------------------⚡ (We have used data ref Z which is absent from our file. There are 32 dashes. See the effect...)
D (Now let us update Jones - his number has changed...)
T (Puts Jones at the top)
J (to update mode)
GT (get telephone number
901-995 3311⚡D (replace with new data, return to Display mode.)
(Finally, we can take a save of the file...)
YVFTELNUM⚡⚡

We leave you to experiment further - edit more report formats, update the file, explore the search facilites, leave no menu option untried.

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SEARCH MODE

We have seen that mm F I will make the whole file available for Display mode viewing. But when a file is very long then it becomes more useful to let the computer pick out just those records which you need. Search mode does this, and very swiftly, by looking at a particular item in each record and comparing it with an Argument which you supply. Records which qualify are flagged as Selected and are reflected in the "Sel=nnnnn" value. To start a search from scratch, you would ensure that no records are selected initially. Use mm F to set Sel=00000. Now use mm S to start the search dialogue.

The first search menu invites A (All) or L (Sel) or M (mm). Use A to search all unselected records, and select those which match. Use L to search only those records already selected, and unselect those which do not match. The use of A will increase the "Sel=nnnnn" count if any unselected records match. The use of L will decrease the count if any selected records fail to match.

Having pressed A or L, you are then asked for the data reference of the items to be compared. Press the corresponding key, or back out via ENTER.

The next menu asks whether the data is to be treated as character (C) or numeric (N). Numeric data is normalised in flight to NNNNNNNNNNN.NN, e.g. 27.198 is treated as 00000000027.19 for the purpose of the comparison.

The next menu asks for the type of comparison, and a good way to remember your choice here is the word "GLUES". Note that S (Scan) only works if the previous menu response is C, denoting character search.

Finally, you are asked for the Argument - i.e. the value with which the target items are to be compared. If you have chosen numeric treatment, then the argument must be numeric too.

MF then responds by updating the Sel=nnnnn count and re-offering the top Search menu, from which you can refine the search further, or exit to mm or to Display mode.

Now let us examine in more detail the comparison process. For a numeric search, the meaning of G/L/U/E is self-evident, we hope. But if a record does not have the target item present, then the comparison is deemed to fail even if the comparison type is U (unequal). If a record is met with non-numeric target item, then the search halts with the prompt "Non-numeric data:Skip (or) Update". Press S to ignore the record, or U to enter Update mode at that record. If you choose U then the search cannot be resumed directly.

Character search is a little more involved. Firstly, upper case and lower case letters are considered equal for the purpose of comparison. (They are also so considered for the purpose of sequence in Display mode.) Secondly, if the argument is shorter than the item in the record, but equal as far as it goes, then argument and item are considered equal. Thus searching for items equal to "FRED" we will match records having "FREDERICK", "fred", "Freda". If the argument is longer than an item, then they are never considered equal. A record with "FRE" will be considered less than the 'FRED' argument.

Character scan (S) hunts for equality anywhere within the target items, such that argument "FRED" will match data such as "Alfred the Great", "MANFRED MANN", "Aunt Freda".

There is a way to search based upon the presence or absence of an item, regardless of its value, since an absent item is considered to start with binary zero. Thus a character search with argument " 0" (note the leading blank) will differentiate records with the item from those without it. Use comparison type L to select those records without the item, and G to select those with the item.

We have chosen the search menu letters so that with practice you will soon make searches without even looking at the menus. Your search parameters are listed on the screen to remind you what you entered. You can reach Search mode directly from Display mode, as well as from mm.

We finish this chapter with a short example of a three-pass search, which you can use on the Example file. We will search for all records where Salary is between 14000 and 15000 and Department is Admin. Using the same notation as in the EXERCISE earlier, we start at mm....

```
PSA5NG14000⊁     (gives us everyone with Salary over 14000)
LSNL15000⊁      (keeps only those with Salary below 15000)
_DCEadm⊁        (keeps only those with Department starting "adm")
D               (Display the selected records.)
```

TOTAL/AVERAGE

MF can compute and display the total and average of numeric items of selected records. As with numeric search, the data is normalised in flight, ignoring any decimal places beyond the second. The total is displayed with most leading zeros suppressed. Any non-numeric item halts the process with the same Skip/Update option as described in SEARCH MODE. If a selected record has no target item, then it is deemed to have value zero for the purpose of computing the average. Negative numbers are not acceptable, and the only non-numeric character allowed is a single decimal point.

Total/Average can be done from mm or from Display mode. The result is shown in lines 19-21. In Display mode, this can be printed.

It is possible only to total items of one data reference at a time. For more complex arithmetic processing one must write some User Basic, q.v.

LOAD AND SAVE

Use mm V to initiate a SAVE. A simple menu asks you to choose between F (File only) or P (Program and File); or you can back out with ENTER.

When you select P, the save is in two parts. First, the Basic (which includes the F$ file), then the machine code. You are asked for the save name, up to 10 characters, which becomes the name of the Basic component and is displayed in blue in mm. If you press ENTER alone, this is taken to mean "same name as before". The name used for the second part of the save is built into the Basic.

When you select F, only character array F$ is saved, and the name is solicited as with P.

You may wish to put an automatic VERIFY into line 4020, just before the "GO TO USR R"...
     VERIFY "" DATA F$():
(See BASIC COMMAND MODE for how to access the Basic in order t make this change.) Then after a file save, rewind the tape, insert EAR jack, and play the tape. If all is well, mm is resumed. Otherwise, GO TO 1 and try the save again.

The file in F$ includes system data, data names, and report formats - as well as your file records.

To load any file which has been saved separately, i.e. via mm V F, you use mm V L. You must give the exact file name, or back out with ENTER. If you forget the name, just give a name of XXX and play the tape. Spectrum will display "Character Array: filename", and you can then BREAK, GO TO 1, and try again. On successful load, mm is resumed with the new file name and revised statistics. It is not necessary purge a file before loading another, since Spectrum wipes out F$ before loading the new F$.

To load MF initially, CLEAR ~~57347~~ *57036* LOAD "" and play any tape which has on it a full save (i.e. saved via mm V P).

We suggest that you keep at least three generations of your files for security, using 3 or 4 cassettes in rotation. Never make a save of the "son" directly over the "father", since any power interruption would leave you with no file at all.

See MICRODRIVE for adaptation to the use of Microdrive cartridges.

STATISTICS

MF gives an almost constant display of file statistics, in line 23. This clears only while text is being keyed. The display consists of...

        Recs=xx.xx Sel=xxxxx Spa=xxxxx

The first count is the number of records in the file, and does not include the special data names and report format records which share F$ with the file proper.

The second count is the number of records currently flagged as selected, i.e. eligible for display in Display Mode, and eligible for User Basic, Total/Average, etc. Note that when records are first created, they are created as "selected".

The third figure is the approximate number of RAM bytes available for file expansion. The figure varies by a small amount depending upon the machine stack, but is a good guide to the amount of spare space you have. Any attempt to overflow the file will result in a flashing red prompt in the lower part of the screen, "FILE FULL". Press any key to resume, but with the last operation aborted. It is recommended that old records be purged, or the file split into two files (again via mm P), when spare bytes fall below 500 or so. And you will need even more spare space if the file is ever to be converted to cartridge. (See MICRODRIVE)

USER BASIC

Although MF is a versatile filing system, all it does is hold data, search it, and present it. Any processing on the data is done by virtue of you updating individual items. But if you are prepared to write some Basic, you can convert MF into a file processor too. With User Basic you can examine and even update the file. For example, suppose you have a file of pupil records, with a series of exam result items in each record. You can compute the average mark for each pupil and store this as an extra item in each record. You may also wish to use User Basic to LPRINT to a non-ZX printer, via a suitable interface.

User Basic is given control by mm U Y. Only selected records are passed to User Basic for processing. The program as delivered has no User Basic other than a simple return, so that mm U Y has no effect on the file until some extra Basic is inserted.

When you invoke User Basic (mm U Y), Basic is given control at specific line numbers, as follows...

Line 4900. Control comes to 4900 just once, before any records are processed. You can use this control point to establish parameters for use at the other points, e.g. INPUT a discount rate, or set a switch. As with each control point, you must terminate with a GO TO USR R statement.

Line 5000. Control comes here at the start of each selected record, but before any data from the record is passed. Use this to perform any record initialisation, e.g. zero an accumulator. Terminate with GO TO USR R.

Line 6000. Control comes here once for each item in a selected record. The item is accessible in C$, which is a dimensioned character array, length 130. C$(1) is the data reference, A-Z, and C$(2 TO) is the data itself, right-filled with spaces. You can store it into another variable if you need to use the data later on. Think of line 6000 as "data capture". Terminate with GO TO USR R.

Line 7000. Control comes here once for each selected record, after all items have been seen at line 6000. Here you can perform processing on the data you captured at line 6000, and then set up C$ in one of the following ways...

  a) LET C$="" to signal that no change is to be made to the record.

  b) LET C$="X" - which sets C$(2 TO) to blanks - to signal that the item whose data ref is "X" is to be erased, if present in the record. "X" must be capital A-Z.

  c) LET C$="X" and C$(2 TO) = data, to signal that item whose data ref is "X" is to be inserted, or replaced if already there. "X" must be capital A-Z.

Control must be returned to MF proper via GO TO USR R.

Note that only one data item per record can be affected by line 7000 in any one pass of User Basic. You might be able to provided multiple item updates using several passes, but this would need some clever use of line 4900 etc.

The order in which records are passed through User Basic is unsequenced. i.e. the order the records were first added to the file. You must not re-dimension C$, and on no account disturb variables F$ and R. Be prepared for relatively long delays while User Basic processes the file. Completion of User Basic processing is signalled by the return of mm.

Use the technique described in BASIC COMMAND MODE to get into a position to code your User Basic. Once it is coded, GO TO USR 1 to return to mm. Test it on just a few selected records initially. When it works, take a Program save via mm V F etc. so that you can use it thereafter.

We finish this chapter with a simple example of User Basic, where in a stock file there are records which contain two relevant items, viz "Q" being quantity of stock, and "C" being the unit cost. We require to generate a new item "V" being the value of stock, computed as the product of Quantity times Unit Cost. (Q * C). Further, we wish to be able to recalculate all Value data on demand. It is very easy...

```
4900 GO TO USR R
5000 LET C=0: LET Q=0: GO TO USR R
6000 IF C$(1)="Q" THEN LET Q=VAL C$(2 TO)
6010 IF C$(1)="C" THEN LET C=VAL C$(2 TO)
6020 GO TO USR R
7000 LET C$="V"; LET C$(2 TO)=STR$(Q*C): GO TO USR R
```

Line 4900 has no file initialisation to do. Line 5000 sets variables C and Q to zero in case we don't find data in a record - better a zero value than misleading residue of previous record. Line 6000 etc. captures the Q and C items, and also converts them to numeric into variables of the same name - but we could have used any suitable variable names. Line 7000 builds a "V" item and passes it back for insertion or replacement. By the way, we avoided the slicker "7000 LET C$="V"+STR$(..." because a bug in ROM sometimes gives a wrong result with string concatenation.

In the above example, any non-numeric data in the quantity or unit cost data would halt with a Basic diagnostic. For this situation, or any other halt, just recover with GO TO 1.

MICRODRIVE

With a few changes to the Basic part of MF, the program will work perfectly with the Microdrive. Many users will be able to adapt MF themselves, but for the less confident, we suggest an adaptation along the following lines. Remember that the Microdrive does not give you bigger MF files - just more convenient access.

Start by loading MASTERFILE from cassette in the normal way, include any User Basic required, and empty the file. Save the machine code by breaking in via mm L and CAPS SHIFT 6, and entering without line number...

SAVE *"m";1;"MF mcode"CODE 57344,8192 *57037, 8499*

Next, alter the lines which contain SAVE and LOAD...

```
4020 SAVE *"m";VAL "1";C$( TO VAL "10") DATA F$(): GO TO USR R
4030 SAVE *"m";VAL "1";C$( TO VAL "10") LINE VAL "4035": GO TO USR R
4035 LOAD *"m";VAL "1";"MF mcode"CODE: GO TO VAL "1"
4050 LOAD *"m";VAL "1";C$( TO VAL "10") DATA F$(): GO TO USR R
```

And now alter line 1...

1 PRINT :: PAPER VAL "7": GO TO USR VAL "64951"

(In case you were wondering...VAL "number" saves 3 RAM bytes compared with just...number.)

GO TO 1 and take a save via mm V P etc. - this will save just the Basic, and you need not do this again except after revising your User Basic.

Now, assuming you have earlier saved your files onto cassette via mm V F etc, you must now transfer them to cartidge, and we suggest the following little program...

10 LOAD "" DATA F$(): INPUT N$: SAVE *"m";1;N$ DATA F$()

MF modified as described will run entirely using your Microdrive number 1, and we suggest the use of File save rather than Program save, for most purposes. Note that you cannot re-save onto the same cartridge using the same name, so we recommend the use of date-stamped names, e.g. "ACCT Aug24". This also helps you to read your CAT directory and decide which files are old enough to be erased.

You should seriously consider backup of files, either by saving to a different cartridge, or copying to cassette as follows...

10 INPUT N$: LOAD *"m";1;N$ DATA F$(): SAVE N$ DATA F$()

SOME POKES

To patch the machine code logic of MF, get into Basic Command Mode, and use POKE with
no line numbers. Then GO TO 1 and take a save via mm V P etc. (Or, for Microdrive, save
the machine code as described under MICRODRIVE.)

Here are some possibilities...

a) If you want more than 26 data references, we can increase the range to allow 0-9 and
the special characters between 9 and A, as follows...
    POKE 64282,48: POKE 64306,48: POKE 58166,48

b) Single-key responses are acknowledged with a low BEEP, whether or not the key is
appropriate. You can POKE your own choice of duration of this BEEP at 57741. You can
tune the pitch of the BEEP at 57745 (coarse) and 57744 (fine).

c) When text is being keyed, the PIP note is deliberately more audible than the
Spectrum default. You can POKE this to taste at 57725.

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MASTERFILE NEW MICRO-PRINT FEATURE

Please note that the number "57343" in pages 6 and 16 should
now read "57036", and that "57344.8192" in page 19 should
read "57037.8499".

Your manual reflects MF version 7, but your MF cassette is
at version 08, with the major enhancement of including
Myrmidon's MICRO-PRINT 42/51. As its name suggests, this
feature lets you print 42 or even 51 characters per line by
reducing the pixel width of each character. The result is
more information per screen for your reports. We have
retained the conventional 32-pitch for MF menus etc, but you
can specify Micro-print for your report literals and data
text. Paper colour extends to real character boundaries, due
to the Spectrum design. We have had to sacrifice the FLASH
option when using Micro-print.

The way to specify Micro-print is as follows...

In EDIT mode, after giving the line number of an element,
you are prompted with "Micro-prt Y/N". Reply with the N key
to stay with 32-pitch. Otherwise, press Y key and then you
are prompted with "42-pitch Y/N". Reply Y to select 42-pitch
characters, or N to select 51-pitch. Then when you give
column and width specifications, you find that MF lets you
extend to column 41 or 50. Remember that the start column
you give is no longer as you would find from the normal
spacing chart. You can compute approximate real column by
multiplying by 6/8 or by 5/8 for 42-pitch or 51-pitch
respectively. You can mix all three print sizes in one
report if you wish. When reviewing your report elements, you
see pitch in place of FLASH data.

The exercise described in page 13 is no longer quite right,
due to a few extra prompts of "Micro-prt Y/N". Reply N to
these then continue with the responses as given in the
exercise.

Micro-print 42/51 is the copyright of Myrmidon Software of
P.O.Box 2, Tadworth, surrey Kt20 7LU. The MF version is
highly adapted and streamlined for MF use, but Myrmidon
supply it in a form which can be used in any program.